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<b>TRANSMITTAL FORM</b>  (to be used for all correspondence after initial filing)	Application Number	10/663,944	
	Filing Date	September 16, 2003	
	First Named Inventor	Warren M. Farnworth	
	Group Art Unit	2823	
	Examiner Name	W. Brewster	
		Attorney Docket Number	2269-5700US (02-1183.00/US)

ENCLOSURES (check all that apply)		
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Date	May 16, 2005	

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**PATENT**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

**In re Application of:**

Warren M. Farnworth

**Serial No.:** 10/663,944

**Filed:** September 16, 2003

**For:** STEREOGRAPHIC METHOD  
FOR FORMING INSULATIVE COATINGS  
FOR VIA HOLES IN SEMICONDUCTOR  
DEVICES, INSULATIVE COATINGS SO  
FORMED, SYSTEMS FOR FORMING THE  
INSULATIVE COATINGS, AND  
SEMICONDUCTOR DEVICES

**Confirmation No.:** 3861

**Examiner:** W. Brewster

**Group Art Unit:** 2823

**Attorney Docket No.:** 2269-5700US

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**APPEAL BRIEF**

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Attn: Board of Patent Appeals and Interferences

Sir:

This Appeal Brief is being submitted in the format required by 37 C.F.R. § 41.37(c)(1),  
with the fee required by 37 C.F.R. § 41.20(b)(2).

I. REAL PARTY IN INTEREST

U.S. Application Serial No. 10/663,944 (hereinafter "the '994 Application"), the application at issue in the above-referenced appeal, has been assigned to Micron Technology, Inc., as evidenced by the assignment that has been recorded with the U.S. Patent & Trademark Office (hereinafter "the Office") at Reel No. 014519, Frame No. 0191. Accordingly, Micron Technology, Inc., is the real party in interest in the above-referenced appeal.

II. RELATED APPEALS AND INTERFERENCES

Neither Appellants nor the undersigned attorney are aware of any action pending before the Board of Patent Appeals and Interferences (hereinafter "the Board") that would affect or influence the Board's decision in the above-referenced appeal.

III. STATUS OF CLAIMS

Claims 1-25 are currently pending and under consideration in the above-referenced application.

Claims 26-47 were withdrawn from consideration and canceled, without prejudice or disclaimer, pursuant to elections made in response to a restriction requirement.

Claims 1-25 are subject to final rejections, which are to be reviewed in the above-referenced appeal.

IV. STATUS OF AMENDMENTS

The '944 Application was filed on September 16, 2003, with forty-seven (47) claims.

On June 16, 2004, a Restriction Requirement was mailed. In responding to the Restriction Requirement, an election was made, without traverse, to prosecute claims 1-25. The Response to Restriction Requirement was mailed on June 25, 2004, in accordance with the requirements of 37 C.F.R. § 1.8, and received a filing date of June 29, 2004.

A first action on the merits of claims 1-25 followed on August 9, 2004, in which each of claims 1-25 was rejected. Formal revisions to several of the claims were presented along with explanations as to the patentability of each of the claims in an Amendment mailed November 9, 2004. That Amendment was mailed in accordance with the requirements of 37 C.F.R. § 1.8 and received a filing date of November 15, 2004. No further claim amendments have been presented in the above-referenced application.

All of the claim rejections were maintained in a Final Office Action that was mailed on December 15, 2004. In response, an Amendment Under 37 C.F.R. § 1.116 was mailed on February 15, 2005, in accordance with the requirements of 37 C.F.R. § 1.8. That Amendment, which received a filing date of February 17, 2005, included additional remarks, which clearly distinguished the subject matter recited in the claims from the art upon which the final rejections of the claims were based.

Unfortunately, as evidenced by the Advisory Action dated March 8, 2005, and the remarks that accompanied the Advisory Action, all of the claim rejections were maintained.

Accordingly, a Notice of Appeal was mailed on March 15, 2005, and is followed by this Appeal Brief. As May 15, 2005, fell on a Sunday, this Appeal Brief, which is being filed on Monday, May 16, 2005, should be deemed to have been filed within two months of the mailing date of the Appeal Brief. 37 C.F.R. § 1.7.

V. SUMMARY OF CLAIMED SUBJECT MATTER

Claims 1-9 of the '944 Application are directed to a method for insulating at least one aperture formed through a substrate. Claims 10-25 are directed to a method for forming electrically conductive vias through a substrate. In the claimed methods, unconsolidated dielectric material is introduced into at least one aperture (or precursor hole) that extends through a substrate. Claims 1 and 10. The unconsolidated dielectric material is selectively consolidated to form an insulative coating on surfaces of the at least one aperture. *Id.* When a conductive via is to be formed in the aperture, conductive material may be introduced into the aperture.

*See claim 22.*

VI. GROUND OF REJECTION TO BE REVIEWED ON APPEAL

(A) Claims 1-11 and 14-21 are finally rejected under 35 U.S.C. § 102(b) for reciting subject matter which is purportedly anticipated by that described in Japanese Patent Publication No. 04-024987 to Keita (hereinafter "Keita"); and

(B) Claims 12, 13, and 22-25 stand finally rejected under 35 U.S.C. § 103(a) for reciting subject matter which is assertedly unpatentable over that taught in Keita and, further, in view of teachings from U.S. Patent Publication No. 2004/0112881 A1 to Bloemeke et al. (hereinafter "Bloemeke").

VIII. ARGUMENT

A. REJECTIONS UNDER 35 U.S.C. § 102

Each of claims 1-11 and 14-21 stands rejected under 35 U.S.C. § 102(b).

1. LEGAL AUTHORITY

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single reference which qualifies as prior art under 35 U.S.C. § 102. *Verdegaal Brothers v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). The identical invention must be shown in as complete detail as is contained in the claim. *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

2. REFERENCE RELIED UPON

*Keita*

The portion of *Keita* that can be understood (that which was provided in English) discloses fabrication of a portion of a printed wiring board by irradiating, with laser light 9, photosetting resin 10 in a vessel 6. CONSTITUTION. "By repeating irradiation in succession, base material of a printed wiring board . . . can be obtained." *Id*; *see also*, Figs. 3a through 3c. This resulting base material includes through holes that are oriented nonvertically relative to the plane in which the base material resides. *See* Fig. 1; *see also* PURPOSE ("through holes [are oriented] in the direct except the directly vertical to a hole opening surface") and CONSTITUTION ("through holes 3 . . . have a 45° gradient to a 2mm thick board . . .").

3. ANALYSIS

a. CLAIMS 1-9

Independent claim 1 is directed to a method for insulating at least one aperture formed through a substrate. The method of independent claim 1 includes introducing a quantity of unconsolidated material into at least one aperture of the substrate, as well as selectively consolidating material located adjacent to a periphery of the at least one aperture to form an insulative coating thereon.

Keita includes no express or inherent description of “introducing a quantity of unconsolidated dielectric material into . . . at least one aperture.” In fact, since the printed wiring board of Keita includes through holes 3 that are formed in photosetting resin 10 as the base material of the printed wiring board is formed, there would be no reason to introduce a quantity of unconsolidated dielectric material into the through holes 3. Any unconsolidated dielectric material within the through holes 3 of the printed wiring board substrate disclosed in Keita would merely remain in place as the substrate and its through holes 3 are fabricated; it, therefore, could not be introduced into the through holes 3.

Moreover, Keita neither expressly nor inherently describes “selectively consolidating unconsolidated dielectric material . . . to form an insulative coating on surfaces of . . . at least one aperture.” There is no express or inherent description in Keita of any process for forming a dielectric coating on the surfaces of the through holes 3. This is because the base material disclosed in Keita is formed from a dielectric photosetting resin 10, and the surfaces of the through holes 3 that extend therethrough are already formed from dielectric material. Any unconsolidated dielectric material that remains within the through holes 3 is not selectively

consolidated. Rather, it would merely be removed prior to the fabrication of other printed wiring board features (*e.g.*, conductive traces, conductive vias, etc.) on the substrate or the assembly of other printed wiring board features with the substrate.

Therefore, Keita does not anticipate each and every element of independent claim 1, as would be required to maintain the 35 U.S.C. § 102(b) rejection of independent claim 1.

Claims 2-9 are each allowable, among other reasons, for depending either directly or indirectly from claim 1, which is allowable.

Claim 4 is further allowable since Keita neither expressly nor inherently describes dispensing a quantity of unconsolidated dielectric material into at least one aperture. Instead, the through holes 3 that are described in Keita are formed around unconsolidated dielectric material, which remains therein until the base material of a printed wiring board is removed from the photosetting resin 10 within a fabrication vessel 6.

Claim 5 is additionally allowable because Keita includes no express or inherent description of lowering a level of a substrate to introduce a quantity of photosetting resin 10 into a through hole 3. Rather, photosetting resin 10 would already be present in the through hole 3, as the through hole 3 would be formed as a result of nonirradiation of that portion of the surface of the photosetting resin to laser light 9.

Claim 7 is also allowable since Keita does not expressly or inherently describe forming an insulative coating, let alone an insulative coating that includes multiple layers.



b. CLAIMS 10, 11, and 14-21

Independent claim 10 recites a method for forming electrically conductive vias through a substrate. The method of independent claim 10 includes forming at least one precursor hole through a substrate, introducing unconsolidated dielectric material into the at least one precursor hole, and selectively consolidating portions of the dielectric material at locations adjacent to a periphery of the at least one precursor hole to form a layer of an insulative coating on surfaces thereof.

Instead of disclosing “forming at least one precursor hole through [a] substrate,” the description of Keita is limited to forming through holes 3 *while* the base of a printed wiring board is being formed. As there is not substrate prior to the formation of the through holes 3, the through holes 3 cannot be formed *through* the substrate.

Moreover, Keita does not expressly or inherently describe that unconsolidated dielectric material is introduced into a through hole 3. Rather, since the base of the printed wiring board of Keita is formed in a vessel 6 of unconsolidated photosetting resin 10, any unconsolidated dielectric material that is present within a through hole 3 as the through hole 3 is defined is already in place when the through hole 3 is defined. Therefore, it could not be introduced into the through hole 3. In any event, since the walls of the through hole 3 are presumably already formed from a dielectric material, there would be no reason to introduce more dielectric material into the through holes 3.

Further, Keita lacks any express or inherent description of selectively consolidating unconsolidated dielectric material *within* a through hole 3. Instead, the portion of the description of Keita that is understood is limited to defining a base with through holes 3 from unconsolidated

photosetting resin 10. There would be no reason to “form a layer of an insulative coating on the surfaces of” the through holes 3 of the wiring board base disclosed in Keita.

In view of the foregoing, it is respectfully submitted that the subject matter recited in independent claim 10 is, under 35 U.S.C. § 102(b), allowable over the subject matter disclosed in Keita.

Claims 11 and 14-21 are each allowable, among other reasons, for depending either directly or indirectly from claim 10, which is allowable.

Claim 11 is additionally allowable since Keita lacks any express or inherent description of the shapes of holes 3 that may extend through the substrate 11 disclosed therein. In particular, Keita lacks any express or inherent description of a through hole 3 that may have a substantially cylindrical shape, a substantially frustoconical shape, an hourglass shape, or a bulging center.

Claim 16 is further allowable since Keita neither expressly nor inherently describes dispensing a quantity of unconsolidated dielectric material into at least one aperture. To repeat: any unconsolidated photosetting resin 10 within through holes 3 was there when through holes 3 were defined in the wiring board base.

Claim 17 is additionally allowable because Keita includes no express or inherent description of lowering a level of a substrate to introduce a quantity of photosetting resin 10 into a through hole 3. Rather, photosetting resin 10 would already be present in the through hole 3, as the through hole 3 would be formed as a result of nonirradiation of that portion of the surface of the photosetting resin to laser light 9.

Claim 19 is also allowable since Keita does not expressly or inherently describe forming an insulative coating, let alone an insulative coating that includes multiple layers.

For these reasons, it is respectfully requested that the 35 U.S.C. § 102(b) rejections of claims 1-11 and 14-21 be reversed.

B. REJECTIONS UNDER 35 U.S.C. § 103(a)

Claims 12, 13, and 22-25 have been rejected under 35 U.S.C. § 103(a).

1. LEGAL AUTHORITY

The standard for establishing and maintaining a rejection under 35 U.S.C. § 103(a) is set forth in M.P.E.P. § 706.02(j), which provides:

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

2. ADDITIONAL REFERENCE RELIED UPON

*Blomeke*

The teachings of Blomeke are drawn to processes for trepanning a hole through a laminated substrate with a laser.

3. ANALYSIS

Claims 12, 13, and 22-25 are each allowable, among other reasons, for depending either directly or indirectly from claim 10, which is allowable.

Claims 12, 13, and 22-25 are further allowable because Blomeke does not provide any teaching or suggestion that would remedy the aforementioned deficiencies in the disclosure of Keita with respect to the subject matter recited in independent claim 10, from which each of claims 12, 13, and 22-25 depends.

Furthermore, without improperly relying upon the disclosure of the above-referenced application, one of ordinary skill in the art would not have been motivated to combine the teachings of Keita and Blomeke in the manner that has been asserted. This is because Keita teaches a process that includes fabricating a printed wiring board substrate from an unconsolidated dielectric material. As the substrate is being defined from the unconsolidated dielectric material, through holes 3 or desired configurations and dimensions are also defined. Since the through holes 3 are not subsequently defined by so-called subtractive processes, such as drilling, there would be no need to employ the drilling and trepanning processes that are taught in Blomeke. Nor would one of ordinary skill in the art have been motivated to use drilling or trepanning processes to form or enlarge the through holes 3 of the printed wiring board substrate of Keita.

For these reasons, the Examiner has not established a *prima facie* case of obviousness against any of claims 12, 13, or 22-25. Accordingly, reversal of the 35 U.S.C. § 103(a) rejections of claims 12, 13, and 22-25 is respectfully requested.

VIII. CLAIMS APPENDIX

The current status of each claim that has been introduced into the above-referenced application is set forth in CLAIMS APPENDIX to this Appeal Brief.

IX. EVIDENCE APPENDIX

There is no EVIDENCE APPENDIX to this Appeal Brief.

X. RELATED PROCEEDINGS APPENDIX

No decisions have been rendered by the Board or any court in a related application. Therefore, this Appeal Brief is not accompanied by a RELATED PROCEEDINGS APPENDIX.

XI. CONCLUSION

It is respectfully submitted that:

(A) Claims 1-11 and 14-21 recite subject matter which, under 35 U.S.C. § 102(b), is allowable over the subject matter described in Keita; and

(B) Claims 12, 13, and 22-25 are drawn to subject matter that, under 35 U.S.C. § 103(a), is allowable over the subject matter taught in Keita and Blomeke.

Accordingly, it is respectfully requested that the rejections of claims 1-25 be reversed and that each of these claims be allowed.

Respectfully submitted,



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CLAIMS APPENDIX

1. A method for insulating at least one aperture formed through a substrate, comprising:  
introducing a quantity of unconsolidated dielectric material into the at least one aperture; and  
selectively consolidating unconsolidated dielectric material located adjacent to a periphery of the  
at least one aperture to form an insulative coating on surfaces of the at least one aperture.
2. (Previously Presented) The method of claim 1, wherein introducing comprises  
introducing a quantity of unconsolidated UV-curable dielectric material into the at least one  
aperture.
3. (Previously Presented) The method of claim 2, wherein selectively consolidating  
comprises exposing portions of the unconsolidated UV-curable dielectric material to UV  
radiation in the form of a laser beam.
4. (Previously Presented) The method of claim 1, wherein introducing comprises  
dispensing the quantity of unconsolidated dielectric material into the at least one aperture.
5. (Previously Presented) The method of claim 1, wherein introducing comprises  
lowering a level of the substrate relative to a level of a volume of the unconsolidated dielectric  
material.

6. (Previously Presented) The method of claim 1, wherein selectively consolidating comprises directing an energy beam onto selected regions of the quantity of unconsolidated dielectric material.

7. (Previously Presented) The method of claim 1, further comprising:  
repeating introducing and selectively consolidating at least once to form another layer of the insulative coating.

8. (Original) The method of claim 1, further comprising:  
removing unconsolidated dielectric material remaining within the at least one aperture.

9. (Previously Presented) The method of claim 8, wherein, upon removing, a via hole that extends through the insulative coating is exposed.

10. (Previously Presented) A method for forming electrically conductive vias through a substrate, comprising:  
forming at least one precursor hole through the substrate;  
introducing unconsolidated dielectric material into the at least one precursor hole; and  
selectively consolidating portions of the unconsolidated dielectric material at locations adjacent to a periphery of the at least one precursor hole to form a layer of an insulative coating on surfaces of the at least one precursor hole.



11. (Previously Presented) The method of claim 10, wherein forming comprises forming the at least one precursor hole to have one of a substantially cylindrical shape, a substantially frustoconical shape, an hourglass shape, and a bulging center.
12. (Previously Presented) The method of claim 10, wherein forming includes drilling through the substrate.
13. (Previously Presented) The method of claim 12, wherein forming further includes trepanning the substrate.
14. (Previously Presented) The method of claim 10, wherein introducing comprises introducing an unconsolidated UV-curable dielectric material into the at least one precursor hole.
15. (Previously Presented) The method of claim 14, wherein selectively consolidating comprises exposing portions of the UV-curable dielectric material to UV radiation in the form of a laser beam.
16. (Previously Presented) The method of claim 10, wherein introducing comprises dispensing the unconsolidated dielectric material into the at least one precursor hole.

17. (Previously Presented) The method of claim 10, wherein introducing comprises lowering a level of the substrate relative to a level of a volume of unconsolidated dielectric material.
18. (Previously Presented) The method of claim 10, wherein selectively consolidating comprises directing an energy beam onto the portions of the unconsolidated dielectric material.
19. (Previously Presented) The method of claim 10, further comprising:  
repeating introducing and selectively consolidating at least once to form another layer of the  
insulative coating.
20. (Previously Presented) The method of claim 10, further comprising:  
removing unconsolidated dielectric material remaining within the at least one precursor hole.
21. (Previously Presented) The method of claim 20, wherein, upon removing, a via  
hole that extends through the insulative coating is exposed.
22. (Previously Presented) The method of claim 21, further comprising:  
introducing conductive material into the via hole.

23. (Previously Presented) The method of claim 22, wherein introducing conductive material comprises introducing at least one of polysilicon, a metal, a metal alloy, a conductive elastomer, and a conductor-filled elastomer into the via hole.

24. (Previously Presented) The method of claim 22 wherein introducing conductive material comprises at least one of physical vapor depositing, chemical vapor depositing, electrolytic plating, electroless plating, and immersion plating.

25. (Previously Presented) The method of claim 22, wherein introducing conductive material comprises dispensing the conductive material.

26-47 (Canceled)